Technical Report 633

AD-A168 192

The Development of Performance-Based Reenlistment Standards

Edward J. Schmitz, Abraham Nelson, and Frances C. Grafton

DTIC
SELECTED
JUN 0 2 1986
D
D

Personnel Utilization Technical Area

Manpower and Personnel Research Laboratory

DTIC FILE COPY

ari

U. S. Army

Research Institute for the Behavioral and Social Sciences

June 1984   86   2 047

U. S. ARMY RESEARCH INSTITUTE

FOR THE BEHAVIORAL AND SOCIAL SCIENCES

A Field Operating Agency under the Jurisdiction of the

Deputy Chief of Staff for Personnel

EDGAR M. JOHNSON
Technical Director

L. NEALE COSBY
Colonel, IN
Commander

Technical review by

Jeff Horey
Clessen J. Martin
Clinton B. Walker

REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER ARI Technical Report 633	2. GOVT ACCESSION NO.	3. RECIPIENT'S CATALOG NUMBER
4. TITLE *(and Subtitle)* THE DEVELOPMENT OF PERFORMANCE-BASED REENLISTMENT STANDARDS		5. TYPE OF REPORT & PERIOD COVERED May 1983–August 1983
		6. PERFORMING ORG. REPORT NUMBER --
7. AUTHOR(s) Edward J. Schmitz, Abraham Nelson, & Frances C. Grafton		8. CONTRACT OR GRANT NUMBER(s) --
9. PERFORMING ORGANIZATION NAME AND ADDRESS U.S. Army Research Institute for the Behavioral and Social Sciences 5001 Eisenhower Avenue, Alexandria, VA 22333-5600		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS 2Q162722A791 2.4.1.1
11. CONTROLLING OFFICE NAME AND ADDRESS U.S. Army Research Institute for the Behavioral and Social Sciences 5001 Eisenhower Avenue, Alexandria, VA 22333-5600		12. REPORT DATE June 1984
		13. NUMBER OF PAGES 35
14. MONITORING AGENCY NAME & ADDRESS*(If different from Controlling Office)* --		15. SECURITY CLASS. *(of this report)* Unclassified
		15a. DECLASSIFICATION/DOWNGRADING SCHEDULE --

16. DISTRIBUTION STATEMENT *(of this Report)*

Approved for public release; distribution unlimited

17. DISTRIBUTION STATEMENT *(of the abstract entered in Block 20, if different from Report)*

--

18. SUPPLEMENTARY NOTES

--

19. KEY WORDS *(Continue on reverse side if necessary and identify by block number)*

Reenlistment	Reenlistment standards
Reenlistment decision making	Reenlistment eligibility
Retention	Reenlistment criteria
Skill Qualifications Test	Selection for reenlistment

20. ABSTRACT *(Continue on reverse side if necessary and identify by block number)*

   One key personnel management issue for the Army is determining who should be permitted to reenlist. This paper examines the use of three potential bases for reenlistment standards: grade, aptitude area scores, and skill qualification scores. The impact of potential standards is analyzed in terms of manpower requirements, projected performance, and demographic characteristics.

Technical Report 633

The Development of Performance-Based Reenlistment Standards

Edward J. Schmitz, Abraham Nelson, and Frances C. Grafton

Personnel Utilization Technical Area
Paul A. Gade, Chief

**Manpower and Personnel Research Laboratory
Joyce L. Shields, Director**

ARI Research Reports and Technical Reports are intended for sponsors of R&D tasks and for other research and military agencies. Any findings ready for implementation at the time of publication are presented in the last part of the Brief. Upon completion of a major phase of the task, formal recommendations for official action normally are conveyed to appropriate military agencies by briefing or Disposition Form.

Accesion For		
NTIS CRA&I		✓
DTIC TAB		☐
Unannounced		☐
Justification		
By		
Distribution /		
Availability Codes		
Dist	Avail and / or Special	
A-1		

QUALITY INSPECTED 3

The retention of high quality soldiers is one of the major goals of the Army's personnel system. Experienced senior enlisted people are among the Army's most valuable resources.

Research reported examines a new approach for establishing reenlistment standards that would increase the pool of highly qualified soldiers and be acceptable to all soldiers as fair and equitable.

The work was performed as part of ARI's research effort in the area of Retention and Reenlistment, and in the more general research domain associated with Manning the Force.

EDGAR M. JOHNSON
Technical Director

THE DEVELOPMENT OF PERFORMANCE-BASED REENLISTMENT STANDARDS

EXECUTIVE SUMMARY

Requirement: ~This report~

To develop new first-term reenlistment standards to help the Army select the most qualified soldiers equitably and effectively.

Procedure:

Grade, aptitude area composite scores, and skill qualifications test scores (SQT) were identified as potential reenlistment standards. A data base of pertinent information for reenlistment was constructed. The standards were analyzed for their impact on total requirements, expected performance, and demographic characteristics in FY83.

Findings:

Promotion potential to E-4 or above was found useful as a minimum reenlistment standard. However, additional criteria were needed to bring expected reenlistments into agreement with requirements. Increasing the aptitude area score for reenlistment by 5 points would have satisfied the need to limit end strength but would have adversely affected minorities. SQT-based standards would affect minorities less and increase expected performance over aptitude area standards.

Utilization of Findings:

SQT should be considered as an additional reenlistment standard, either replacing or supplementing aptitude area scores. The operational feasibility of implementing SQT standards should be investigated.

THE DEVELOPMENT OF PERFORMANCE-BASED REENLISTMENT STANDARDS

CONTENTS

LIST OF TABLES

LIST OF FIGURES

CONTENTS (Cont.)

THE DEVELOPMENT OF PERFORMANCE-BASED REENLISTMENT STANDARDS

INTRODUCTION

Reenlistment standards play a key role in the management of the Army's military personnel system. Standards determine the number and kinds of people who will be permitted to reenlist. If standards are set too high, manpower requirements may be unsatisfied. If standards are set too low, then many low-quality personnel will reenlist.

This research discusses a new approach for establishing reenlistment standards. Performance-based criteria, such as rank and the Skill Qualification Tests (SQT), are compared to present reenlistment standards. The analysis demonstrates that such standards would not only improve military occupational specialty (MOS) performance, but would reduce the negative impact present standards have on minorities.

This report comprises four main sections. The first section describes the reenlistment standards and environment that existed in FY83. The second section discusses the development of new standards based upon available MOS performance data. The third section discusses the impact of the new standards on reenlistment quality and demographic factors. The final section summarizes the conclusions of the research and recommends policy changes based on these findings.

REENLISTMENT STANDARDS

This section of the report describes the reenlistment process and environment that created the need to modify procedures.

The Reenlistment Process

Establishing reenlistment standards is a balancing act. The first objective of reenlistment standards is to assure the quality of soldiers who will become the Army's senior noncommissioned officers (NCOs). The Army obtains these NCOs through development and retention. It cannot go into the labor market to hire experienced armor or infantry NCOs.

Thus, the challenge is to balance demands for both quality and quantity. Standards should reflect aggregate requirements and supply. Standards should also remain relatively stable, so that the quality of individuals eligible to reenlist does not fluctuate arbitrarily over time. (See Schmitz, 1984, for an approach to remedy this problem.)

Figure 1 illustrates the model used for evaluating reenlistment policy. The specific steps involved in the process are described below.

The first step is to determine how many individuals will be reaching their expected termination of service (ETS) date within the period of interest (e.g., FY83). Persons are eligible to reenlist when they are within 6 months of their
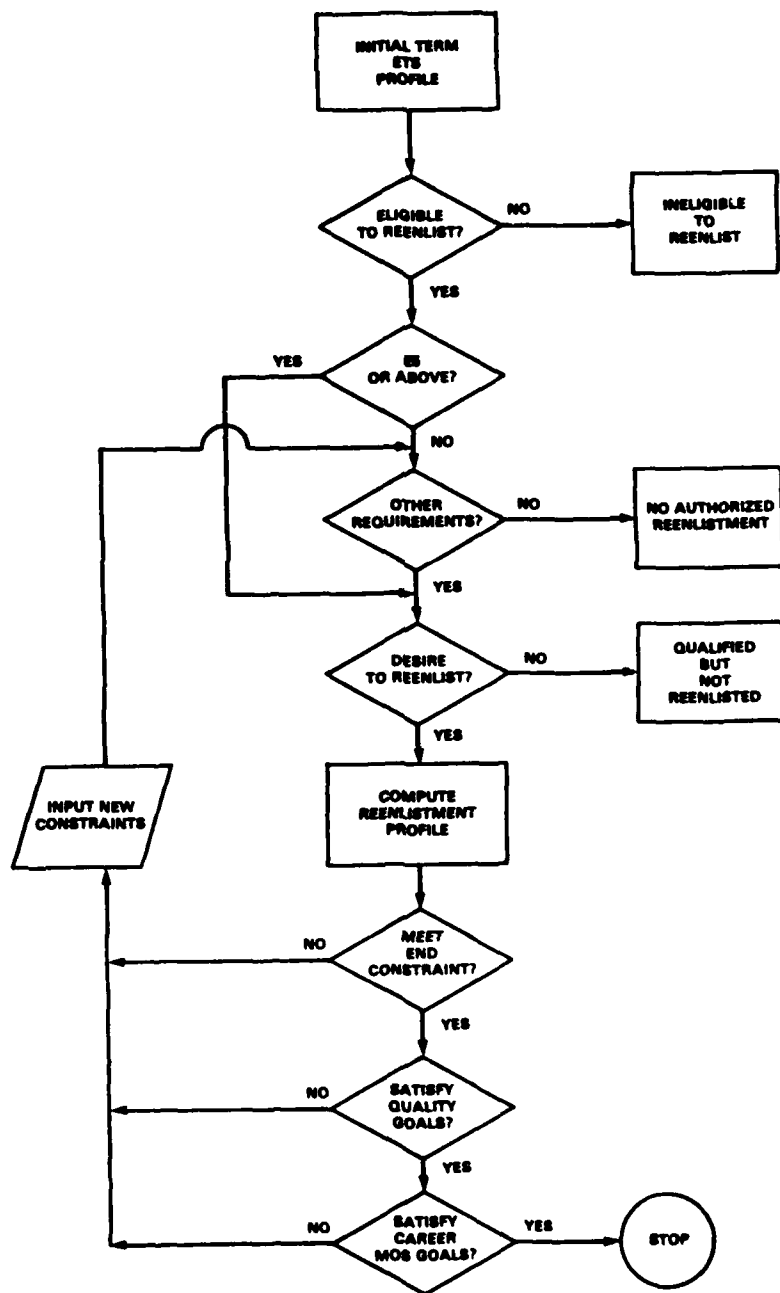
1

Figure 1. Reenlistment model.

2

ETS date. For example, an eligible individual with a 3-year contract is eligible to reenlist after serving 30 months. However, not everyone who reaches ETS is eligible to reenlist. The first criterion for reenlistment is general eligibility. Individuals with bars to reenlistment, such as generally poor discipline records, would be prevented from reenlisting (unless granted a waiver).

Grade is the second major reenlistment criterion. Individuals who have reached E-5 or above are permitted to reenlist; those who are E-3 or below are not allowed to reenlist. Individuals who are E-4 or E-3(P) are evaluated against other reenlistment requirements. Currently, the attainment of three aptitude area scores of 85 or above (95 on the previous Armed Services Vocational Battery (ASVAB)) is the principal standard. Such scores indicate trainability in a broad range of Army occupations.

Once the Army has specified the individuals who are eligible to reenlist, the decision is the responsibility of the soldier. Generally, he or she has 6 months to decide. However, most individuals decide to reenlist within the first 2 months of eligibility.

While it is impossible to determine what any one individual will choose, some generalizations can be made about the behavior of a reenlistment cohort. Voluntary reenlistment rates vary by MOS. For example, soldiers in MOS 76Y (Unit Supply Specialist) have a much higher reenlistment rate than those in MOS 19E (M48-M60 Armor Crewmen).

AFQT category is another significant factor. The higher category soldiers (I-IIIA) have lower reenlistment rates than AFQT category IIIB and IV soldiers. Presumably the individuals in the upper categories have greater opportunities outside the military. Other factors, such as race, education, economic conditions, and selective reenlistment bonuses (SRB) have a significant impact on the individual's reenlistment decision. (See Daula and Fagan, 1982.) However, this report focuses on making short-term projections of reenlistment probabilities based on recent experience.

Once probabilities of reenlistment are known, the profiles of reenlistees can be determined and compared to such manpower planning measures as end strength, quality goals, MOS distribution, and other personnel characteristics. If the reenlistment cohort is unsatisfactory in some respect, personnel managers can modify reenlistment standards (such as grade, aptitude area scores, or SQT scores) and evaluate the impact of the modified standards. SRB and migration policies can also be used to achieve such goals. (See Fagan, 1984.)

The FY83 Reenlistment Environment

During FY83 the Army reenlistment environment changed. Traditionally, the Army had sought to retain virtually all qualified personnel who sought to reenlist. However, in FY83 more soldiers desired to reenlist than the Army required. Furthermore, because of calibration problems in entrance tests during FY77-FY80, the cohort of individuals reaching service termination were of low quality, with over half of them in AFQT category IV, the lowest category eligible for service.

The magnitude of the problem faced by the Army was that over 7,000 or 23% more soldiers were projected to reenlist than the Army required. This 23% potential surplus in first-term reenlistments was not the reenlistment problem typically faced by the Deputy Chief of Staff for Personnel (DCSPER).

Two factors created this problem. First, economic, social, and political conditions had changed considerably from the recent past. The economy had become sluggish, with unemployment increasing from 5.9% at the beginning of FY80 (October 1979) to 10.4% at the beginning of FY83 (October 1982). Also, military compensation had improved over this period. Military pay increased 44.1% from FY79-FY82, compared to 23.5% for civilians. Dale and Gilroy (1983) showed that these were significant factors influencing enlistment behavior. Thus, substantial shifts in economic factors during FY80-FY83 increased retention.

The second factor was the reenlistment quality goal. During FY77-FY80 the ASVAB had been miscalibrated. Many individuals who enlisted then were actually in the lower AFQT categories. Thus, approximately 51% of the individuals eligible to reenlist in FY83 were in AFQT category IV. Furthermore, these individuals had a greater reenlistment propensity than individuals in the upper categories (I-IIIA), since I-IIIAs are likely to have greater civilian job opportunities. (This finding has also been identified elsewhere--see Daula and Fagan, 1982.) Thus, not only were reenlistment rates projected to be substantially higher in FY83, but given the operational standards and population characteristics, many marginally qualified individuals would choose to reenlist; such individuals would substantially lower the quality of future NCO leadership.

DEVELOPMENT OF REENLISTMENT STANDARDS

The analysis of reenlistment standards contained three steps:

1. Identify potential reenlistment standards
2. Construct a reenlistment data base
3. Analyze the impact of new standards

A variety of alternatives could be used for reenlistment standards. These include no standard, cost, retention, training performance, promotion potential, and job performance.

Having no standard would mean selecting for reenlistment on a first-come, first-served basis. Minimizing cost could be done by awarding bonuses only when no reenlistment candidates were available for a particular MOS (migration policy could be used to minimize bonuses required, for example). Maximizing retention could be achieved through preferentially selecting those soldiers most likely to remain until retirement. Increasing retention could minimize the number of accessions required in the future.

These standards tend to focus on minimizing costs of some kind, but ignore the importance of reenlistment standards in assuring performance quality and an effective fighting force. Hence, standards that could be related to soldier effectiveness were sought.

Standards that had face validity, were used historically, were widely available for the majority of people reaching reenlistment, and were related to MOS or soldier performance were investigated. These standards included rank, training potential (aptitude area composite scores), and job performance (Skill Qualification Test scores).

To analyze different reenlistment standards, a data base was constructed. The data base consisted of records on the following:

1. Accessions from FY76-FY78
2. SQT test scores from FY78-FY80

The two data files were merged and all individuals who had served at least 30 months were retained for analysis. SQT test scores were normalized and converted to standardized test scores by test version so that scores could be compared across tests and years. (Appendix A contains the layout of the variables in the analysis file.)

A more recent data base of accessions for FY79 and FY80 would have been desirable, since the FY79-FY80 enlistment cohort would be the primary group reaching the first-term reenlistment decision point in FY83. During FY83, however, SQT data were only available for FY78-FY80, so the later cohort could not be analyzed. However, the FY76-FY78 enlistees took the same version of the ASVAB as the FY79-FY80 cohort and had similar education, AFQT category, sex, and racial characteristics. (See Appendix B for a comparison of enlistment cohorts.)

Reenlistment criteria were examined for their impact on total strength, enlisted quality or performance goals, specific MOS requirements, and demographic characteristics. First, the total number of soldiers reenlisting should achieve end strength goals. Neither too few, nor too many should be permitted to reenlist. Quality of personnel is also important; the Army wants to select the most qualified soldiers. However, defining and measuring quality is difficult. Two measures were reviewed, AFQT category and SQT score. Reenlistment goals must take into account MOS requirements so that adequate numbers of people reenlist by specific MOS, as well as Army-wide. For example, it would be inappropriate for the Army to have adequate personnel reenlist, but lack half the personnel required in MOS 19K (M-1 crewmen). Finally, demographic effects of reenlistment policies were examined. That is, while race should not be used to set reenlistment policies, it may be important to know how different policies could affect the racial composition of the force.

IMPACT OF REENLISTMENT STANDARDS

To analyze FY83 reenlistments, three different reenlistment criteria were examined:

1. Grade
2. Aptitude area composite scores
3. SQT scores

The results in each area are reported below.

Grade

Grade was the first reenlistment criterion examined. Presumably, those individuals who have performed best in the eyes of their superiors and peers are the soldiers the Army should keep. Grade, however, is either not selective enough or is too selective, depending on which criteria are used. Approximately 85% of the reenlistment cohort reaching ETS has reached the grade of E-4. Although E-5 automatically qualify for reenlistment, and E-3s are not permitted to reenlist, there still would be a surplus of reenlistees if only the 15% who are E-3 and below are eliminated.

Probabilities of being promoted to E-4 or above appeared to exhibit very little variability. Figure 2 shows the percentage of soldiers reaching ETS who were E-4 or above, broken down by AFQT category and race. There was some variation by AFQT category, with categories I-IIIA having the highest promotion rate (87%) and category IV having the lowest rate (81%). There were no differences between white and nonwhite promotion rates, once AFQT category was taken into account.

Aptitude Area Composite Scores

There are 10 aptitude area scores computed from the Armed Services Vocational Aptitude Battery. Aptitude area scores are used as prerequisites to qualify for training in a particular MOS. To assure competence for training in broad categories of MOS, reenlistees are currently required to achieve three scores of 95 on ASVAB version 6/7 (old score) or three scores of 85 on the current (new) ASVAB. Since all soldiers take the ASVAB to enlist, aptitude area scores provide a common basis for comparing all soldiers.

Three reenlistment standards were evaluated:

1. 3 scores of 95 on the old ASVAB (or 85 current)
2. 3 scores of 100 on the old ASVAB (or 90 current)
3. 3 scores of 105 on the old ASVAB (or 95 current)

Table 1 illustrates the probability of qualifying against each of the three aptitude area standards, broken down by AFQT category. An increase in aptitude area standards leaves categories I-IIIA virtually unaffected, affects category IIIB only slightly, and significantly reduces the number of category IV eligible to reenlist. Less than half would qualify with a 5-point increase in score requirements, and only about one fourth would qualify if minimum score requirements were raised 10 points. Other combinations of ASVAB scores could have been used, but would be subject to the same weaknesses as the above three score combinations. Also, aptitude area scores tend to be highly intercorrelated. (For example, see McLaughlin, Rossmeissl, Wise, Brandt, and Wang, 1984.)

Figure 3 compares what would have happened to total reenlistments if aptitude area standards were raised. Raising the scores 5 points would reduce the surplus from 7,400 to 2,300. Increasing the aptitude area score an additional 5 points would result in a shortfall of 4,300.
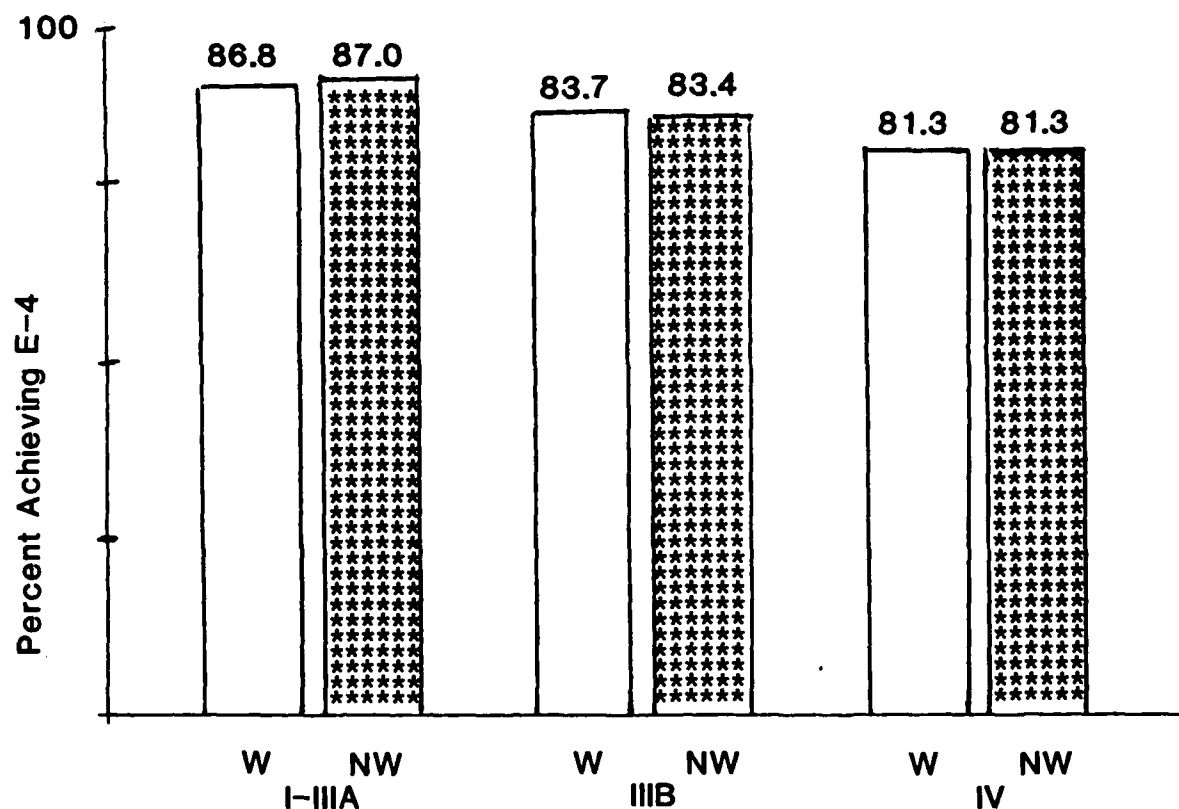
Figure 2. Achievement of grade E-4 by race and mental category.

Table 1

Probabilities of satisfying different area aptitude qualifying score requirements

Mental category	3-95s (old) 3-85s (new)	3-100s (old) 3-90s (new)	3-105s (old) 3-95s (new)
I-IIIA	99.8	99.5	98.2
IIIB	95.6	88.1	72.8
IV	63.6	46.6	27.6

Analysis of FY76-FY78 ASVAB 6/7 accessions who reached reenlistment ETS
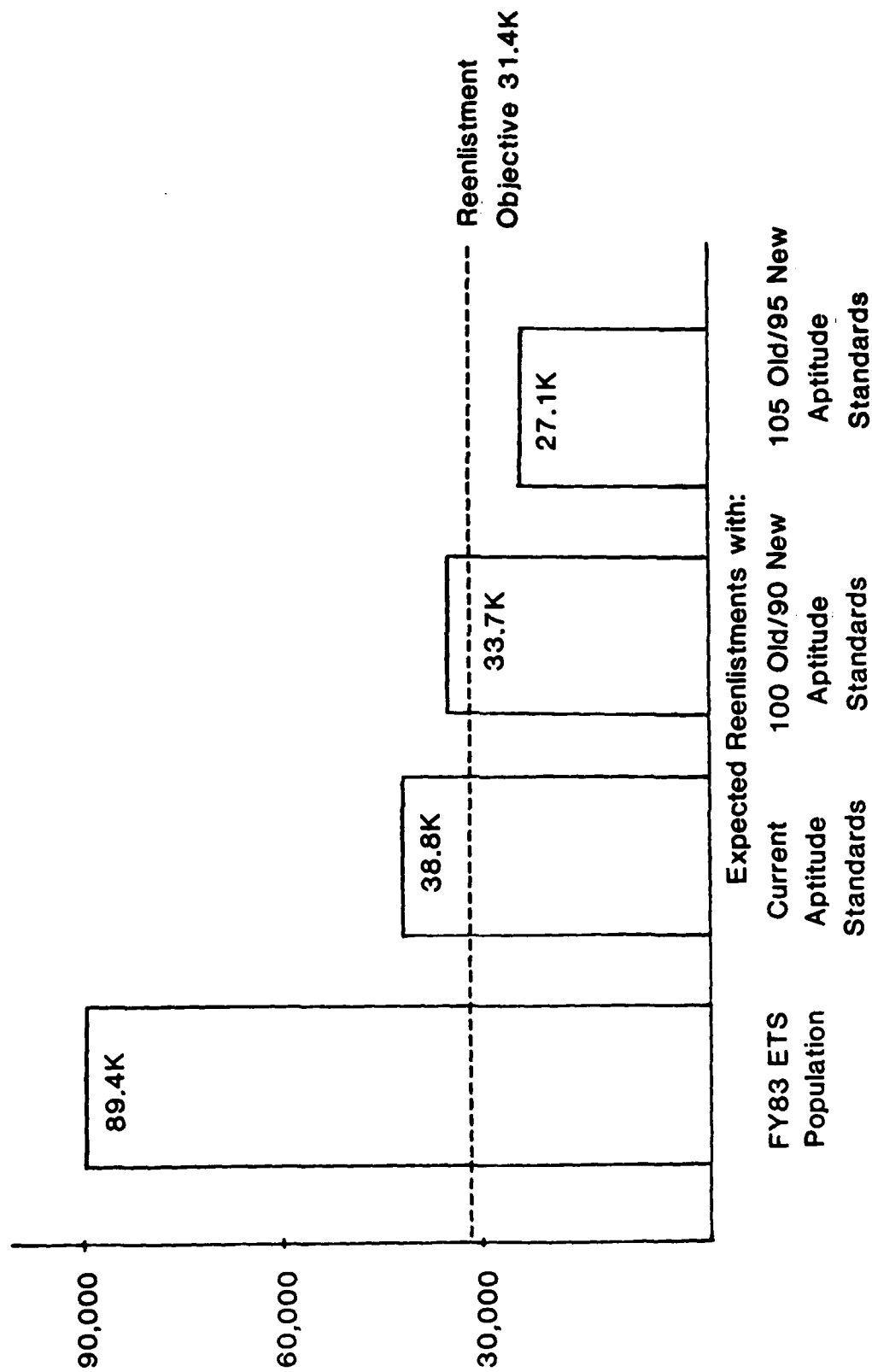
Figure 3. The impact of aptitude area composite standards on expected reenlistments.

Given the difficulty of fine-tuning the reenlistment standards, the data suggest an increase in aptitude area scores of 5 points would be appropriate to balance the supply of reenlistees against requirements. Detailed MOS-level forecasts of requirements were unavailable for this analysis. Therefore, it was not possible to analyze the impact of reenlistment standards on specific MOS requirements. (According to the DCSPER Objective Force Analysis Branch, such data should be available now from the enlisted FORECAST system.)

The aptitude area standards were examined in terms of their impact of AFQT category and racial composition of the force. Figure 4 shows the AFQT category distribution for several populations of interest. To achieve a reenlistment cohort that is similar to the current accession cohort, the aptitude area qualifying score would need to be raised to 105 old (95 new). Raising the score to 100 old (90 new) would meet end strength requirements, but would fall short in terms of quality, compared to non-prior-service accessions.

Figure 5 illustrates the percentage of nonwhite individuals who would reenlist under different standards. As the aptitude area qualifying standard increases, the percent of nonwhite individuals declines. Thus, raising the reenlistment standard to 100 old (90 new) would lead to a lower percentage of nonwhite reenlistments.

However, the most serious criticism of ASVAB-based standards is their lack of correlation to job productivity. The Army was recently criticized by OSD for using the general test portion of the ASVAB as a reenlistment standard (Army Times, 1984). Such policy was criticized as being at odds with the promotion system.

SQT Scores

Skill Qualification Tests are given to soldiers to determine how well they have mastered the specific tasks and knowledge required for their MOS. SQT are presently given in MOS covering 85% of first-term soldiers. Thus, while they are not universally administered, SQT are given to an overwhelming proportion of first-term soldiers.

The SQT has considerable face validity as a reenlistment criterion. SQT scores are more job-related and also would be more current than the ASVAB. Presently, passing the SQT is a reenlistment criterion. However, since the SQT became a performance criterion, the percentage of individuals passing the test has become very high. The SQT has been shown to be a good indicator of soldier performance (Hanser & Grafton, 1983). A report by Shields, Hanser, and Popelka (1981) found that SQT scores, when restricted to a specific MOS, discriminated between good and bad performers as identified by commanders and supervisors. Armor (1981) found that the SQT showed that substantial job performance variability existed not just in technical jobs, but in MOS requiring low to moderate skill levels.

The SQT has three components: a written test, a hands-on test, and a performance certification. Generally, the written component is the only section with sufficient variability for statistical analysis. The scores differ by test track (MOS, year, and skill level). To use the SQT for this research, scores were standardized so that each test had a mean of 100 and standard
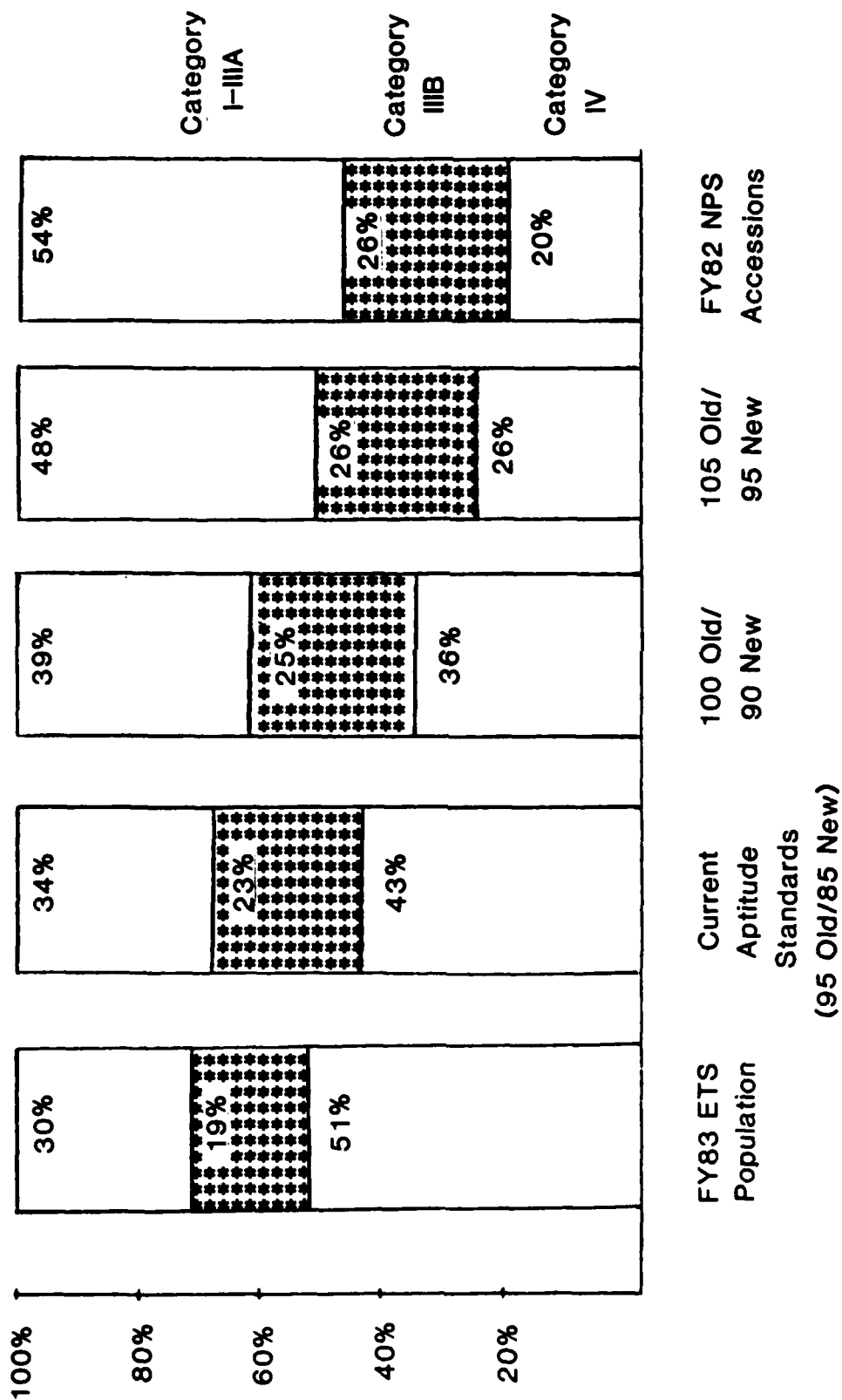
Figure 4. The impact of aptitude area composite standards on mental category composition.

10
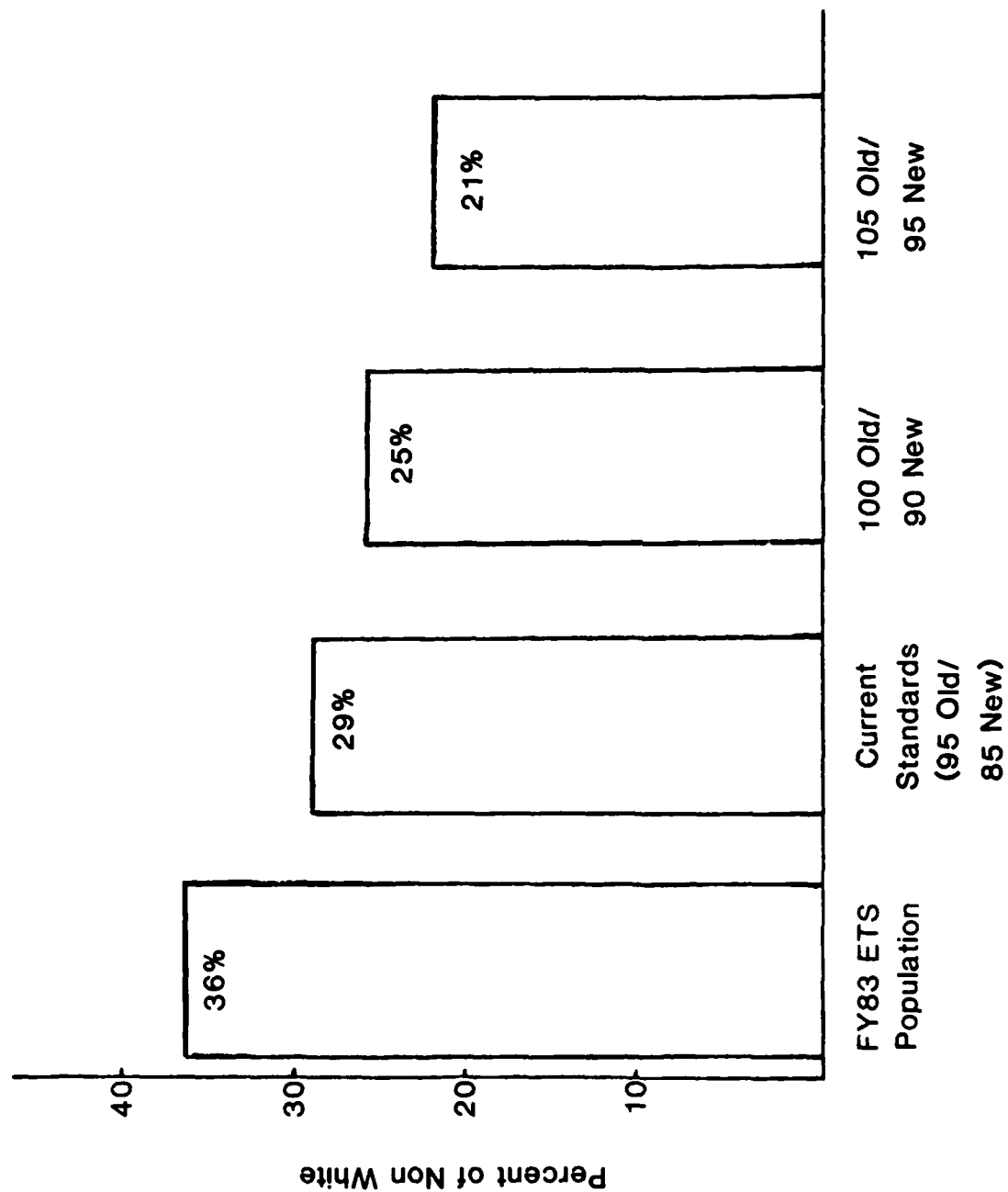
Figure 5. The impact of aptitude area composite standards on percentage of nonwhites eligible for reenlistment.

deviation of 20. (Only those SQT administered to 20 or more soldiers were used.) This permits comparability of scores across tests and corrects one of the previously identified major weaknesses of the use of SQT for performance evaluation (General Accounting Office, 1982).

The reenlistment data base was constructed by merging the accession data from FY76-FY78 with SQT results from calendar year 1978-1980. There were 43,501 cases with both ASVAB and SQT data. These cases covered 65% of reenlistment MOS and 44% of the reenlistment cohort. (More recent data cover a wider range of MOS and could match a greater percentage of scores.) Nevertheless, there were sufficient data across a variety of MOS for analysis of SQT-based reenlistment standards. Forty-six MOS contained sufficient data for analysis of such a standard.

Even though the SQT has been normalized, reenlistment standards have to be adjusted by MOS to achieve impact comparable to ASVAB-based reenlistment standards. For example, in an MOS with high-quality personnel (95B) nearly everyone would qualify under an aptitude-area-based standard (96%). Therefore the normalized SQT score would be set relatively low, at 70. (See Table 2.)

Since SQT scores provide the best current measure of job performance, the tests were used to compare reenlistment standards. The average SQT test scores for individuals satisfying the aptitude area standard and the SQT standard are provided in Table 3. As expected, the SQT standard provides higher average SQT scores in nearly all MOS (45 of 46).

The magnitude of the difference between the aptitude area standard and the SQT standard depends on the percentage of people to be selected. If virtually everyone is permitted to reenlist, it obviously does not matter which standard is used. However, if only a small percentage are selected for reenlistment, then substantial differences appear between the expected performance under the different standards.

The gains in SQT scores that occur from using an SQT reenlistment standard, rather than an aptitude area composite standard, can be significant. Figure 6 displays a plot of the increase in SQT score compared to the percentage of individuals eliminated by the standard 46 MOS. A regression was fitted to this distribution with the following results:

$$\text{SQTGAIN} = -.73 + .15 \text{ PNQUAL} \qquad R^2 = .836$$
$$(.49) \ (.01)$$

where:

SQTGAIN is the gain in average SQT score achieved by using an SQT standard over an aptitude area standard.

PNQUAL is the percentage of candidates in an MOS who would not qualify under a given standard.

The numbers in parenthesis indicate the significance of the coefficients.

There is a strong linear relationship between the percentage of people selected and the SQT score increase. Nearly 84% of the variation was explained

Table 2

Equivalent SQT and ASVAB standards

MOS		Percent achieving three scores above 90	Equivalent SQT standard (normalized score)
Radio Operator	05B	82.9	75
Radio TT Operator	05C	50.6	95
EW/SIGINT Ident/Loc	05H	96.4	0
Infantryman	11B	60.2	95
Indirect Fire Infmn	11C	51.5	100
Hv Antiarmor Wpn Infmn	11H	59.3	100
Combat Engineer	12B	64.5	90
TACFIRE Opns Sp	13C	71.1	85
Cannon Crewman	13B	57.0	95
Cannon Fd Sp	13E	90.2	75
Fire Support Sp	13F	85.3	75
LANCE Crmbr/MLRS Sgt	15D	72.3	85
PERSHING Msl Crmbr	15E	79.9	80
HERCULES Msl Crmbr	16B	37.3	105
HAWK Missile Crmbr	16D	37.5	105
HAWK FC Crmbr	16E	72.9	80
ADA Short Rg Msl Crmn	16P	42.5	100
FA Tgt Acq Sp	17C	87.6	75
Gnd Survl Rdr Crmn	17K	74.7	85
Cavalry Scout	19D	70.8	90
Mchn Comm Eq Op	31M	51.3	95
Wire Sys Inst/Op	36C	48.1	105
Tac Wire Op Sp	36K	44.4	105
Carpentry & Masonry Sp	51B	71.6	90
Pwr Gen Equip Rep	52D	94.1	70
NBC Specialist	54E	74.7	90
Ammunition Sp	55B	37.3	105
Construction Equip Rep	62B	71.4	85
Motor Transport Op	64C	64.2	90
Utility Hel Repairer	67N	78.8	80
Medium Hel Repairer	67U	76.9	80
Obn/Scout Hel Rep	67V	79.6	80
Attack Hel Repairer	67Y	71.7	85
Patient Admin Sp	71G	76.4	85
Administrative Sp	71L	73.0	85
Cmbt Telecom Ctr Op	72E	54.7	95
Petroleum Supply Sp	76W	21.3	110
FA Surveyor	82C	77.8	85
Medical Specialist	91B	75.4	85
Practical Nurse	91C	87.1	75
Operating Room Sp	91D	84.3	80
Dental Specialist	91E	76.6	85

Table 2 (Cont.)

MOS		Percent achieving three scores above 90	Equivalent SQT standard (normalized score)
Medical Lab Sp	92B	88.8	70
Food Service Sp	94B	50.3	100
Military Police	95B	91.5	70
EW/SIGINT Analyst	98C	96.1	65

Table 3

Comparison of SQT and ASVAB on SQT performance

MOS		Average SQT for individual passing ASVAB standard	Average SQT for individual passing SQT standard
Radio Operator	05B	101.8	104.8
Radio TT Operator	05C	105.8	112.4
EW/SIGINT Ident/Loc	05H	98.0	97.9
Infantryman	11B	107.2	112.0
Indirect Fire Infmn	11C	107.6	114.2
Hv Antiarmor Wpn Infmn	11H	103.0	114.0
Combat Engineer	12B	105.3	110.1
TACFIRE Opns Sp	13C	102.4	107.2
Cannon Crewman	13B	104.2	111.8
Cannon Fd Sp	13E	100.6	102.7
Fire Support Sp	13F	101.7	104.3
LANCE Crmbr/MLRS Sgt	15D	99.7	105.3
PERSHING Msl Crmbr	15E	102.4	106.3
HERCULES Msl Crmbr	16B	106.1	116.4
HAWK Missile Crmbr	16D	104.3	116.2
HAWK FC Crmbr	16E	100.6	105.7
ADA Short Rg Msl Crmn	16P	105.9	113.5
FA Tgt Acq Sp	17C	102.4	104.3
Gnd Survl Rdr Crmn	17K	103.1	108.2
Cavalry Scout	19D	106.3	111.6
Mchn Comm Eq Op	31M	103.0	111.8
Wire Sys Inst/Op	36C	101.6	114.6
Tac Wire Op Sp	36K	102.5	116.2
Carpentry & Masonry Sp	51B	106.1	111.1
Pwr Gen Equip Rep	52D	100.1	101.7
NBC Specialist	54E	105.4	109.7

Table 3 (Cont.)

MOS		Average SQT for individual passing ASVAB standard	Average SQT for individual passing SQT standard
Ammunition Sp	55B	104.6	116.4
Construction Equip Rep	62B	103.6	107.4
Motor Transport Op	64C	104.0	109.7
Utility Hel Repairer	67N	103.4	105.2
Medium Hel Repairer	67U	103.2	106.1
Obn/Scout Hel Rep	67V	102.3	105.8
Attack Hel Repairer	67Y	102.4	107.4
Patient Admin Sp	71G	100.3	105.3
Administrative Sp	71L	102.3	108.0
Cmbt Telecom Ctr Op	72E	105.3	113.8
Petroleum Supply Sp	76W	108.7	125.4
FA Surveyor	82C	101.4	108.0
Medical Specialist	91B	102.2	108.7
Practical Nurse	91C	100.0	103.4
Operating Room Sp	91D	101.8	105.9
Dental Specialist	91E	99.8	105.5
Medical Lab Sp	92B	100.3	103.5
Food Service Sp	94B	106.3	114.5
Military Police	95B	100.4	103.2
EW/SIGINT Analyst	98C	99.0	102.1
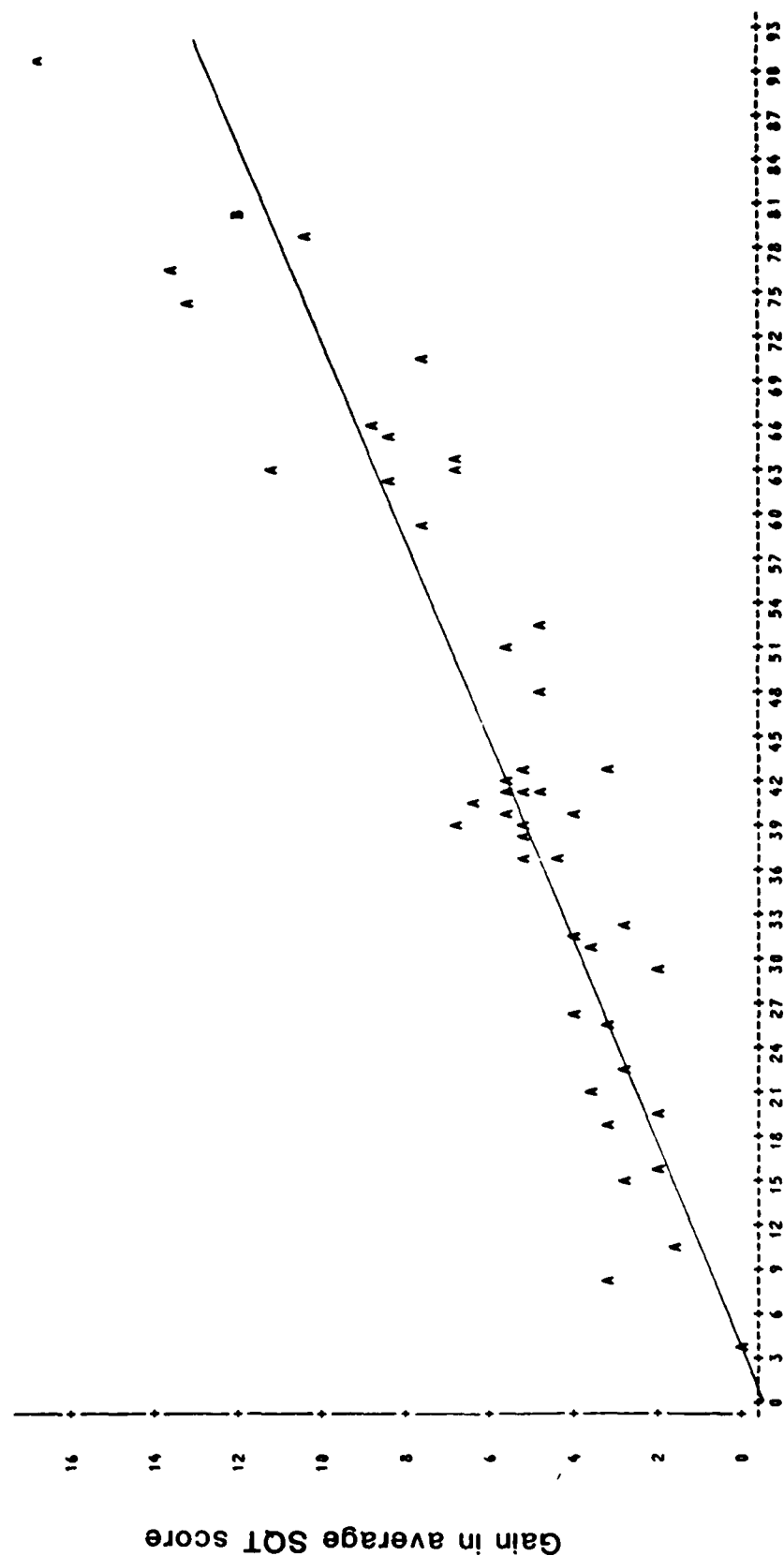
Percent not Qualifying for Reenlistment

Figure 6. Gain in average SQT score versus percent not qualifying on standard.

16

by this single factor. Therefore, it is possible to make accurate projections of the impact of SQT standards on aggregate job performance. If a reenlistment standard were designed to eliminate 40% of the possible reenlistees, the increase in SQT scores would be 5.3 points. It would be very difficult to accomplish a comparable increase in SQT performance through other means. To achieve such an increase with initial testing would require an increase in entry-level aptitude scores of 6 to 13 points, depending on the MOS.

SQT standards are also likely to increase the percentage of nonwhites eligible for reenlistment. Table 4 illustrates how the percentage of nonwhite individuals would differ by MOS. In 34 of 46 MOS, the number of nonwhite individuals qualifying is greater than or equal under an SQT-based standard compared to the ASVAB-based standard. Overall, the percentage of nonwhite individuals qualifying under such a standard was 3.4% higher than under the ASVAB standard.

CONCLUSIONS AND RECOMMENDATIONS

Clearly, reenlistment standards needed to be raised for the Army to stay within personnel strength limits. Rank-based standards do not provide sufficient selectivity. At a minimum, a 5-point increase in aptitude area requirements was necessary to limit total strength. Further raising of standards would be desirable to bring reenlistment quality into alignment with current enlistment quality. Raising the reenlistment test scores by 10 points would bring reenlistment quality closer to current enlistment quality. However, such a standard would cause problems with the mix of experienced and entry-level soldiers. It may not be possible to permit this ratio to change significantly in the short term.

Skill Qualification Tests have several desirable characteristics for a reenlistment standard. SQT contain more recent information, are much closer in job content to actual performance, and generally agree with people's perceptions of the best and worst performers. SQT also would provide reenlistment opportunity to a larger percentage of nonwhite soldiers. Furthermore, future performance, as estimated by the SQT, would be substantially higher than it would be through reliance on initial entry tests.

A number of issues must be resolved if the SQT is to be used as a reenlistment standard. The SQT could be used as a reenlistment selection device, a restriction, or as a standard in combination with other standards. For example, all individuals scoring in the upper half of the SQT could be permitted to reenlist regardless of aptitude area scores. Or the SQT could exclude people, such as those who scored in the lowest quartile. Or a combination of aptitude area scores and SQT scores could be used for a reenlistment standard. Additional analyses and discussions are needed to determine the combinations that best meet the reenlistment criteria. (Appendix C provides an example of one such analysis.) Better information on reenlistment goals by MOS are needed to use SQT standards, since standards must be MOS-specific. Also, an improved understanding of reenlistment probabilities as they relate to demographics, SQT, MOS, and choice characteristics is needed.

Potentially, SQT could be used as a performance standard for selective reenlistment bonuses. Soldiers would be awarded bonuses if they met specified competence standards on the SQT.

Table 4

Percentage of nonwhites qualified under aptitude area and SQT standards

MOS		% Nonwhite qualifying under aptitude area	% Nonwhite qualifying under SQT
Radio Operator	05B	30.6	32.6
Radio TT Operator	05C	51.8	57.1
EW/SIGINT Ident/Loc	05H	23.5	23.5
Infantryman	11B	25.3	29.3
Indirect Fire Infmn	11C	31.5	33.1
Hv Antiarmor Wpn Infmn	11H	29.6	29.0
Combat Engineer	12B	13.5	19.9
TACFIRE Opns Sp	13C	10.2	11.9
Cannon Crewman	13B	38.1	45.3
Cannon Fd Sp	13E	26.5	27.0
Fire Support Sp	13F	26.5	26.5
LANCE Crmbr/MLRS Sgt	15D	29.8	33.2
PERSHING Msl Crmbr	15E	21.9	22.2
HERCULES Msl Crmbr	16B	40.5	55.8
HAWK Missile Crmbr	16D	36.6	49.1
HAWK FC Crmbr	16E	26.6	25.7
ADA Short Rg Msl Crmn	16P	34.2	45.2
FA Tgt Acq Sp	17C	25.1	25.0
Gnd Survl Rdr Crmn	17K	27.8	27.5
Cavalry Scout	19D	23.1	26.0
Mchn Comm Eq Op	31M	55.6	58.3
Wire Sys Inst/Op	36C	49.4	57.9
Tac Wire Op Sp	36K	49.6	58.6
Carpentry & Masonry Sp	51B	13.5	14.2
Pwr Gen Equip Rep	52D	22.5	23.7
NBC Specialist	54E	40.6	45.0
Ammunition Sp	55B	35.0	33.3
Construction Equip Rep	62B	11.6	13.1
Motor Transport Op	64C	22.7	26.0
Utility Hel Repairer	67N	16.5	19.9
Medium Hel Repairer	67U	19.9	23.2
Obn/Scout Hel Rep	67V	19.7	23.8
Attack Hel Repairer	67Y	19.6	22.7
Patient Admin Sp	71G	52.8	53.3
Administrative Sp	71L	53.2	56.7
Cmbt Telecom Ctr Op	72E	46.7	48.5
Petroleum Supply Sp	76W	58.4	61.0
FA Surveyor	82C	18.8	19.7
Medical Specialist	91B	35.4	35.3
Practical Nurse	91C	32.8	32.1
Operating Room Sp	91D	24.2	23.2
Dental Specialist	91E	30.9	26.8
Medical Lab Sp	92B	15.2	13.4

Table 4 (Cont.)

MOS		% Nonwhite qualifying under aptitude area	% Nonwhite qualifying under SQT
Food Service Sp	94B	32.1	35.7
Military Police	95B	12.7	12.4
EW/SIGINT Analyst	98C	7.7	7.4
Average Percentage		28.0	31.4

Finally, a number of operational questions need to be answered on the implementation of SQT standards. Alternatives must be available for those MOS that do not have SQT. Soldiers need sufficient time to take an SQT prior to reenlistment, retesting procedures need to be established, and scores must be normalized and standards set within the reenlistment time frame. The Army and the soldier should both know how they stand for reenlistment prior to the decision point. As the Army becomes more selective in its reenlistment policy, the SQT should be considered for use as a reenlistment standard because it is more related to job performance than entry tests are.

Prior to implementing an SQT-based reenlistment standard, research should be done on how to implement such standards operationally. An experiment should be performed to indicate how the SQT could be used to shape a reenlistment policy different from current standards, and what administrative procedures would be needed to implement SQT-based standards.

REFERENCES

Armor, D. J. (1981). Enlistment standards in the Army. Santa Monica, CA: The Rand Corporation.

Dale, C., & Gilroy, D. (1983). The effects of the business cycle on the size and composition of the U.S. Army. Atlantic Economic Journal.

Daula, T. V., & Fagan, T. W. (1982). Modelling the retention behavior of first-term military personnel: Methodological issues and a proposed specification. West Point, NY: U.S. Military Academy.

Don't tie reups to test scores, DOD tells Army. (1984, February). Army Times.

Fagan, T. W., & Moreno, J. (1984, May). The Army planning model: Manpower distribution and cost optimization extensions. Paper presented at the TIMS/ORSA Joint National Meeting.

General Accounting Office. (1982). The Army needs to modify its system for measuring individual soldier proficiency. FPCD-82-28.

Hanser, L. M., & Grafton, F. C. (1983). Predicting job proficiency in the Army: Race, sex, and education (Technical Report No.   ). Alexandria, VA: U.S. Army Research Institute.

McLaughlin, D. H., Rossmeissl, P. G., Wise, L. L., Brandt, D. A., & Wang, M. (1984). Validation of current and alternative ASVAB area composites, based on training and SQT information on FY 1981 and FY 1982 enlisted accessions (Draft Report). Alexandria, VA: U.S. Army Research Institute.

Schmitz, E. J. (1984). Matching people with jobs: The development of the Army's new personnel allocation system (Draft Report). Alexandria, VA: U.S. Army Research Institute.

Shields, J., Hanser, L., & Popelka, B. (1981). Soldier performance (Working Paper). Alexandria, VA: U.S. Army Research Institute.

APPENDIX A

VARIABLE DICTIONARY FOR REENLISTMENT ANALYSIS DATA BASE

#	VARIABLE	TYPE	LENGTH	POSITION
12	AD	NUM	2	38
8	AFGT	NUM	2	30
9	AFGTCAT	NUM	2	32
31	AFGTORIG	NUM	2	82
2	AGE	NUM	2	12
82	AGRP	CHAR	8	313
21	AI	NUM	2	56
14	AR	NUM	2	42
30	BONUSOPT	NUM	2	80
24	CA	NUM	2	68
26	CC	NUM	2	72
25	CE	NUM	2	70
50	CHARL	NUM	2	123
41	CHARO	NUM	2	104
93	CL6STD	NUM	2	354
23	CM	NUM	2	66
86	CO6STD	NUM	2	340
35	DODOCC	NUM	2	91
44	DODOCCL	NUM	2	110
52	EDUC	CHAR	5	127
3	EDYRS	NUM	2	14
17	EI	NUM	2	48
51	ELIGL	NUM	2	125
42	ELIGC	NUM	2	106
88	EL6STD	NUM	2	344
53	ENTRYCT	NUM	8	132
28	ENTRYMO	NUM	2	76
27	ENTRYYR	NUM	2	74
6	ETHNIC	NUM	2	26
87	FA6STD	NUM	2	342
78	FIRSTSGT	NUM	8	286
10	GI	NUM	2	34
92	GM6STD	NUM	2	352
45	GRADEL	NUM	2	112
36	GRADEC	NUM	2	93
19	GS	NUM	2	52
95	GT6STD	NUM	2	358
84	IS	NUM	8	324
47	ISSPOL	NUM	2	117
38	ISSPOO	NUM	2	98
40	LASTMO	NUM	2	102
39	LASTYR	NUM	2	100
56	LENGHTL	NUM	2	150
43	LENGTHL	NUM	2	108
55	LENGTHMO	NUM	2	148
34	LENGTHC	NUM	2	89
96	M	CHAR	3	360

#	VARIABLE	TYPE	LENGTH	POSITION
18	MC	NUM	2	50
60	MEAN78	NUM	8	161
67	MEAN79	NUM	8	202
71	MEAN80	NUM	8	234
16	MK	NUM	2	46
91	MP6STD	NUM	2	350
57	MOS78	CHAR	3	152
64	MOS79	CHAR	3	193
75	MOS80	CHAR	3	267
58	MOSSKL78	CHAR	4	155
65	MOSSKL79	CHAR	4	196
74	MOSSKL80	CHAR	9	258
83	MOSSGT	CHAR	3	321
11	NO	NUM	2	36
81	O	NUM	8	305
89	OF6STD	NUM	2	346
32	ORIGCAT	NUM	2	84
22	PRIOR	NUM	8	58
5	RACE	NUM	2	24
62	RAWSGT78	NUM	8	177
69	RAWSGT79	NUM	8	218
73	RAWSGT80	NUM	8	250
85	REASON	CHAR	8	332
90	SC6STD	NUM	2	348
61	SD78	NUM	8	169
68	SD79	NUM	8	210
72	SD80	NUM	8	242
54	SEPDATE	NUM	8	140
49	SEPMO	NUM	2	121
48	SEPYR	NUM	2	119
4	SEX	NUM	8	16
20	SI	NUM	2	54
76	SKILL8C	NUM	8	270
15	SP	NUM	2	44
46	SPDL	CHAR	3	114
37	SPDO	CHAR	3	95
80	SGTPASS	CHAR	3	302
1	SSN	NUM	8	4
79	STDSGT	NUM	8	294
63	STDSGT78	NUM	8	185
70	STDSGT79	NUM	8	226
77	STDSGT80	NUM	8	278
94	ST6STD	NUM	2	356
29	TERMEAL	NUM	2	78
7	TESTID	NUM	2	28
33	TRENPCS	CHAR	3	86
59	TRK78	CHAR	2	159
66	TRK79	CHAR	2	200
13	WK	NUM	2	40

APPENDIX B

RECRUITING TRENDS

		FY 74	FY 75	FY 76	FY 77	FY 78
Total Objective		198,000	204,600	192,600	182,200	137,000
Total Accessions		199,196	208,915	193,024	180,718	134,428
% of Objective		100.6	102.1	100.2	99.2	98.1
NPS Male Objective		170,600	167,600	164,100	153,000	109,300
NPS Male Accessions		166,798	165,610	164,291	153,434	106,512
% of Objective		97.8	98.8	100.1	100.3	97.4
NPS Female Objective		14,100	16,300	15,900	14,900	17,600
NPS Female Accessions		15,446	19,070	15,884	14,964	17,517
% of Objective		109.5	117.0	99.9	100.4	99.5
PS Personnel Objective		13,300	20,700	12,600	14,300	10,100
PS Personnel Accessions		16,952	24,235	12,849	12,320	10,399
% of Objective		127.5	117.1	102.0	86.2	103.0
Total Education (NPS)						
Diploma (NPS)	(#)	91,210	106,784	105,543	99,681	91,386
Diploma (NPS)	(%)	50.1	57.8	58.6	59.2	73.7
GED (NPS)	(%)	6.0	8.4	5.4	3.9	3.5
Total Education (NPSM)						
Diploma (Male Only)	(#)	77,839	89,883	91,310	86,228	74,566
Diploma (Male Only)	(%)	46.7	54.3	55.6	56.2	70.0
GED (Male Only)	(%)	5.3	8.0	4.9	3.3	3.5
Test Score Category (NPS)						
I	(#)	6,542	8,391	9,541	3,901	3,127
	(%)	3.6	4.6	5.3	2.3	2.5
II	(#)	50,042	55,968	49,727	29,929	23,826
	(%)	27.5	30.3	27.6	17.8	19.2
IIIA	(#)	39,029	41,983	39,546	23,769	20,133
	(%)	21.4	22.7	21.9	14.1	16.2
I-IIIA	(#)	95,613	106,342	98,814	57,599	47,086
	(%)	52.5	57.6	54.8	34.2	37.9
IIIB	(#)	54,167	59,809	67,750	36,972	28,186
	(%)	29.7	32.4	37.6	22.0	22.7
IV	(#)	32,464	18,529	13,611	73,827	48,757
	(%)	17.8	10.0	7.6	43.8	39.3
Blacks (NPS)	(#)	49,654	42,341	43,881	49,433	42,525
	(%)	27.2	23.0	24.4	29.4	34.3
Two-Year Term (NPS)	(#)	40,353	30,872	998	0	0
	(%)	22.1	16.7	0.6	0.0	0.0
Three-Year Term (NPS)	(#)	126,246	127,060	132,680	127,114	87,362
	(%)	69.3	68.8	73.6	75.5	70.4
Four(+)-Year Term (NPS)	(#)	15,645	26,748	46,497	41,284	36,667
	(%)	8.6	14.5	25.8	24.5	29.6

FY77-FY80 TSC DATA RENORMED

SP6 CASTLEDINE/53037
DAPE-MPA-EA

		FY 79	FY 80	FY 81	FY 82	FY 83[1]
Total Objective		159,200	172,800	136,800	125,100	144,500
Total Accessions		142,156	173,228	137,916	130,198	145,377
% of Objective		89.3	100.2	100.8	104.1	100.6
NPS Male Objective		130,400	134,400	98,500	100,500	116,000
NPS Male Accessions		112,088	135,969	99,613	105,158	116,215
% of Objective		86.0	101.2	101.1	104.6	100.2
NPS Female Objective		18,800	23,400	18,300	15,100	16,400
NPS Female Accessions		17,196	22,210	18,302	15,195	16,516
% of Objective		91.5	94.9	100.0	100.6	100.7
PS Personnel Objective		10,000	15,000	20,000	9,500	12,100
PS Personnel Accessions		12,872	15,049	20,001	9,845	12,606
% of Objective		128.7	100.3	100.0	103.6	104.2
Total Education (NPS)						
Diploma (NPS)	(#)	82,843	85,825	94,730	103,571	116,246
Diploma (NPS)	(%)	64.1	54.3	80.3	86.0	87.6
GED (NPS)	(%)	5.0	3.7	3.1	2.8	4.3
Total Education (NPSM)						
Diploma (Male Only)	(#)	65,647	66,517	77,529	88,376	99,726
Diploma (Male Only)	(%)	58.6	48.9	77.8	84.0	85.8
GED (Male Only)	(%)	5.7	3.8	3.2	3.2	5.0
Test Score Category (NPS)						
I	(#)	2,469	2,391	2,638	3,536	4,638
	(%)	1.9	1.5	2.2	2.9	3.5
II	(#)	19,811	20,482	25,187	34,929	43,862
	(%)	15.3	12.9	21.4	29.0	33.0
IIIA	(#)	17,367	18,346	19,337	25,346	33,030
	(%)	13.4	11.6	16.4	21.1	24.9
I-IIIA	(#)	39,647	41,218	47,162	63,811	81,530
	(%)	30.6	26.0	40.0	53.0	61.4
IIIB	(#)	30,185	34,929	34,335	33,421	35,236
	(%)	23.4	22.1	29.1	27.8	26.6
IV	(#)	59,452	82,031	36,418	23,121	15,965
	(%)	46.0	51.9	30.9	19.2	12.0
Blacks (NPS)	(#)	47,586	47,232	32,236	29,572	29,158
	(%)	36.8	29.8	27.4	24.6	22.0
Two-Year Term (NPS)	(#)	986	1,552	2,150	6,616	4,281[2]
	(%)	0.8	1.0	1.8	5.5	6.7
Three-Year Term (NPS)	(#)	85,519	108,024	73,901	68,741	36,787
	(%)	66.1	68.3	62.7	57.1	57.5
Four(+)-Year Term (NPS)	(#)	42,779	42,779	41,864	44,996	22,949
	(%)	33.1	30.7	35.5	37.4	35.8

FY77-FY80 TSC DATA RENORMED

SP6 CASTLEDINE/53037
DAPE-MPA-EA

[1]FY TO DATE THRU SEP 1983.
[2]DATA AS OF 31 MARCH 1983.

APPENDIX C

COMPARISONS OF PERCENT QUALIFYING UNDER DIFFERENT REENLISTMENT STANDARD COMBINATIONS

MOS		% Passing aptitude area only	% Passing SQT only	% Passing both	% Passing neither
Radio Operator	05B	82.9	87.1	74.5	4.5
Radio TT Operator	05C	50.6	60.1	37.2	26.4
EW/SIGINT Ident/Loc	05H	96.4	100.0	96.4	0.0
Infantryman	11B	60.2	69.0	47.6	18.4
Indirect Fire Infmn	11C	51.5	57.0	36.3	27.8
Hv Antiarmor Wpn Infmn	11H	59.3	51.8	37.2	26.1
Combat Engineer	12B	64.4	71.0	52.0	16.5
TACFIRE Opns Sp	13C	71.1	76.2	58.5	11.1
Cannon Crewman	13B	57.0	63.2	40.4	20.1
Cannon Fd Sp	13E	90.2	92.9	83.9	0.9
Fire Support Sp	13F	85.3	88.5	77.2	3.4
LANCE Crmbr/MLRS Sgt	15D	72.3	76.3	59.0	10.4
PERSHING Msl Crmbr	15E	80.0	80.7	68.5	7.9
HERCULES Msl Crmbr	16B	37.3	45.6	21.3	38.4
HAWK Missile Crmbr	16D	37.5	42.9	19.6	39.2
HAWK FC Crmbr	16E	72.9	80.6	62.9	9.4
ADA Short Rg Msl Crmn	16P	42.5	53.6	29.2	33.2
FA Tgt Acq Sp	17C	87.6	91.0	80.7	2.2
Gnd Survl Rdr Crmn	17K	74.7	75.5	60.7	10.6
Cavalry Scout	19D	70.8	75.6	57.6	11.2
Mchn Comm Eq Op	31M	51.3	56.0	34.0	26.6
Wire Sys Inst/Op	36C	48.1	48.9	25.9	28.9
Tac Wire Op Sp	36K	44.4	47.5	23.5	31.6
Carpentry & Masonry Sp	51B	71.6	74.5	58.4	12.3
Pwr Gen Equip Rep	52D	94.1	94.8	89.4	0.5
NBC Specialist	54E	74.7	81.2	63.4	7.5
Ammunition Sp	55B	37.3	37.3	19.8	45.2
Construction Equip Rep	62B	71.4	75.9	60.1	12.8
Motor Transport Op	64C	64.2	66.4	49.3	18.6
Utility Hel Repairer	67N	78.8	86.5	70.7	5.4
Medium Hel Repairer	67U	76.9	82.6	67.8	8.3
Obn/Scout Hel Rep	67V	79.6	83.0	69.0	6.4
Attack Hel Repairer	67Y	71.7	72.5	57.2	13.0
Patient Admin Sp	71G	76.4	78.9	61.7	6.4
Administrative Sp	71L	73.0	75.1	58.0	9.9
Cmbt Telecom Ctr Op	72E	54.7	55.4	37.5	27.4
Petroleum Supply Sp	76W	21.3	22.4	8.9	65.1
FA Surveyor	82C	77.8	75.3	61.2	8.2
Medical Specialist	91B	75.4	76.2	59.4	7.8
Practical Nurse	91C	87.1	88.5	78.8	3.2
Operating Room Sp	91D	84.3	87.1	73.9	2.4

APPENDIX C (Cont.)

MOS		% Passing aptitude area only	% Passing SQT only	% Passing both	% Passing neither
Dental Specialist	91E	76.6	77.6	60.4	6.2
Medical Lab Sp	92B	88.8	92.4	81.6	0.4
Food Service Sp	94B	50.3	52.0	34.5	32.2
Military Police	95B	91.5	92.0	84.9	1.4
EW/SIGINT Analyst	98C	96.1	95.8	92.0	0.0

860527